CDS 4000

User Manual

Conference Discussion System

CU 4005/4010	**Series Central Units**
DM/CM 44x0 P	**Series Conference Units**
MU 4040	**Microphone Unit**
HM 4042	**Hand Microphones**
MC 4000	**Microphone Control**
SW 4210/4211/4220	**System Control Software**

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Warning

For all customers

The equipment has been tested and found to comply with the limits of the CE test. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. The equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the user manual it may cause harmful interference to radio communications.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

Important

The wires in the main power cord are coloured in accordance with the following codes:

Green-and-yellow:	Earth
Blue:	Neutral
Brown:	Live

The colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug, so please proceed as follows:

The green-and-yellow wire must be connected to the terminal in the plug marked with the letter E or with the safety earth symbol or marked with green-and-yellow colour. The blue wire must be connected to the terminal marked with the letter N or marked with black colour. The brown wire must be connected to the terminal marked with the letter L or marked with red colour.

Caution

The apparatus must be connected to earth.

Do not disconnect any central unit unless the main power has been disconnected.

Safety

Check that the operating voltage of the unit is identical with the voltage of your local power supply. If a voltage conversion is required, consult your DIS dealer or qualified personnel.

Should any liquid or solid object fall into the cabinet, unplug the unit and have it checked by qualified personnel before operating it further.

Unplug the unit from the wall outlet or set the Main Power switch to OFF if it is not used for several days.

To disconnect the cord, pull it out holding the plug. Never pull the cord itself.

Installation

Allow adequate air circulation to prevent internal heat built-up. Do not place the unit on a surface (rugs, blankets, etc.) that may block the ventilation holes.

Do not install units in a location near heat sources such as radiators or air ducts, or in a place exposed to direct sunlight, excessive dust or humidity, mechanical vibration or shock.

To avoid moisture condensations do not install units where the temperature may change rapidly.

Please further observe the installation guidance provided in this manual.

Cleaning

To keep the cabinet in its original condition, periodically clean it with a soft cloth.

Stubborn stains may be removed with a cloth lightly dampened with a mild detergent solution.

Never use organic solvents such as thinners or abrasive cleaners since these will damage the cabinet.

Repackaging

Save the original shipping carton and packing material. They will become handy if you ever have to ship the unit. For maximum protection, repack the unit as originally packed from the factory.

If not supplied with the equipment, a complete transportation and storage box system is available from DIS. We recommend you to use this system for long term protection and care.

Warranty

The individual units in the CDS 4000 are minimum covered by 24 months warranty against defects in materials or workmanship.

Description of the system

Features

The CDS 4000 is an advanced microprocessor controlled system using the latest technology to make it possible to handle a large number of microphones.

Main features:

- Can handle up to 1000 Delegate units
- Can operate in Automatic, Manual, FIFO or Voice Activated modes
- Can be controlled by RS232/422
- Portable/flush mounted units available
- Custom-made models available

Basically the CDS 4000 system can be a fully automatic system with up to 100 microphones when used with one CU 4010 or up to 10 x 100 = 1000 microphones when used with up to ten CU 4010 Central Units.

With the MC 4000 Microphone Controller other features are added to the system such as operator panel, remote volume control, test function, monitor function and other operation modes.

By installing an optional RS 4232 module in the CU 4005/CU 4010 it is possible to monitor the status and control the system from a personal computer via RS232 or RS 422.

Installation of the CDS 4000 system is extremely easy since the microphone units hold the connection cable themselves.

By using genuine DIS extension cables, installation can never be made incorrectly.

System components

All units, which are part of the CDS 4000 system, are listed below.

Model	Description
CU 4005	Central Unit. Automatic and FIFO operation modes, 50 microphone units connected as maximum. Interconnection of up to ten CU 4005/CU 4010 units for of up to 500/1000 microphones. Manual operation with MC 4000 and computer control with optional RS 4232 module built-in.
CU 4010	Same as CU 4005, but with two chains each of up to 50 microphone units, max. 100 microphone units.
RS 4232	Personal Computer Interface with both RS 422 and RS232 communication ports.
MC 4000	Microphone Controller for CU 4005/CU 4010. Automatic, FIFO and manual operation, full control of up to 1000 microphone units, remote volume controls and monitor function.
SW 4210	CDS 4000 Commander. Max. 100 microphone units for Windows ’95/NT/2000/XP
SW 4211	CDS 4000 Commander. Max. 1000 microphone units for Windows ’95/NT/2000/XP
SW 4220	Additional Software for the SW 4210/11including Geographical Display for Windows ’95/NT/2000/XP
DM/CM 4410 P	Portable Delegate/Chairman microphone with loudspeaker and fixed 36 cm gooseneck mic. arm with built-in light indicator.
DM 4420 P	Portable Delegate/Chairman microphone with loudspeaker and XLR-socket for mic.
DM/CM 4450 P	Portable Delegate/Chairman microphone with loudspeaker and fixed 50 cm gooseneck mic. arm with built-in light indicator.
MU 4040	Delegate/Chairman Microphone Unit for invisible installation for use with FD/FC front plates
FD/FC 4xxxx	Front plates for flush mounted installation for use with MU 4040
GM 6422/24/25	Gooseneck microphones with XLR-plug and built-in light indicator (36cm/50cm/63cm).
HM 4042	Hand Microphone with On/Off switch with light indication and built-in light ring.

Modes of operation

The CDS 4000 system can be operated automatically and in FIFO mode when a CU 4005 or CU 4010 is used alone.

Together with the MC 4000 or controlled via the optional RS 4232 board, the CDS 4000 system can also be operated manually.

In short, the operation modes are:

- **Automatic**

  Delegates are allowed to switch their microphones on and off themselves by means of the ON/OFF-button on the microphone units. The red Speak light indicates that the microphone is ON.

- **FIFO (First In First Out)**

  The same as above, but when the limit of allowed speakers is reached, the next delegate pushing the ON/OFF-button on the microphone unit will not go On, but will be placed in Request. So will all the next. They will all be placed in a request queue with the first in the queue flashing with the green Request light indicating that he is next to speak. When one of the open (ON) microphone units is switched off, the next will automatically be switched on. Usually this mode is used with Max. Speakers set to 1.

- **Manual**

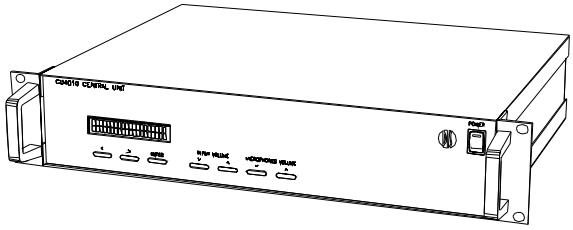
  Delegates cannot turn their microphone on directly, but only make a request to speak by pushing the ON/OFF-button on the microphone units. The microphone can then be turned on from e.g. the MC 4000 or a PC. The green Request light indicates that a "request to speak" has been made, and the red Speak light that the microphone has been turned on by e.g. the MC 4000 or a PC.

  Delegates can still turn their microphone off themselves in manual mode or they can cancel their request to speak made.

Operation

CU 4005, CU 4010

Description



CU 4005/CU 4010 is the central unit of the system and it provides all necessary controls for the basic system. The unit is delivered in chromate and painted steel cabinet with an aluminium front. All materials are chosen to withstand severe climatic conditions such as in the tropics.

The unit can be used as tabletop cabinet by removing the brackets or it can be rack mounted (19"-2HE).

The CU 4005/CU 4010 contains the power supply for the system. The mains input can be selected to a wide range of AC-voltages making world-wide use of the system possible.

An electronically balanced line is provided for tape recorders, buffer amplifiers, etc.

Each CU 4005 is limited to operate 50 units including up to ten CDS 4000 series chairman units.

Each CU 4010 can operate up to 100 units including up to ten CDS 4000 series chairman units.

The maximum number of Chairman units for the system is 10. They can be positioned anywhere among the CDS 4000 series units in the chains.

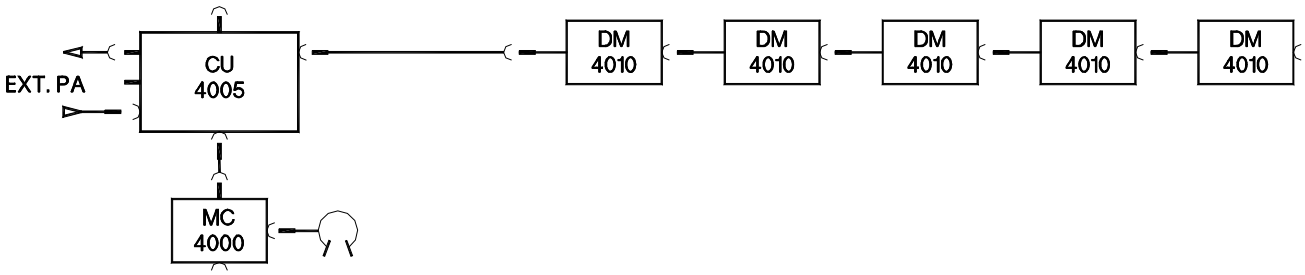
Up to 10 CU 4005/CU 4010 units can be interconnected to accommodate a system with up to 1000 CDS 4000 series units.

Set-up

Plugging the first unit into the CU 4005 or CU 4010 makes connections of the Delegate/Chairman units.

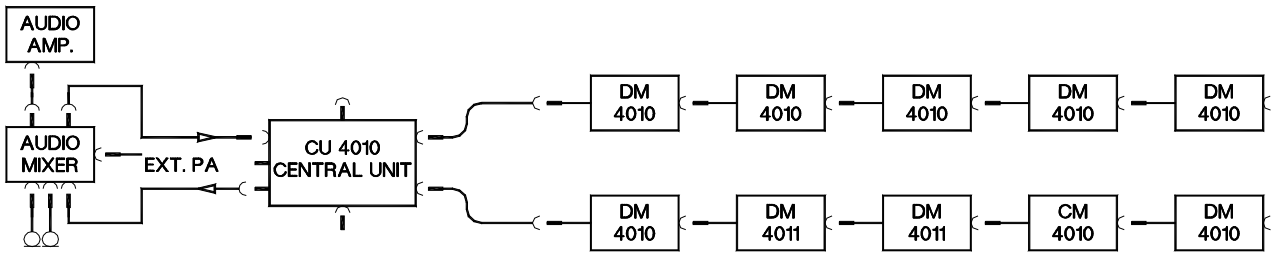
The CDS 4000 units are daisy-chained by connecting each unit to the back of the previous one.

CU 4005 Simple set-up



In this situation the level of the DM/CM 4000 units connected to the Delegate Microphones connector is adjusted with the Microphone Volume control, and the level of the wireless microphone connected to the Input connector is adjusted with the Input Volume control.

CU 4010 set-up with external mixer



In this set-up an external PA system is connected along with some auxiliary microphones. Since only one input connector is available on the CU 4005 /CU 4010 unit, it will be necessary to make use of an external mixer.

The extra microphones as well as the output signal from the CU 4005/CU 4010 are connected to the inputs of the mixer. The mixer outputs are connected to the PA system and the CU 4005/CU 4010 input respectively. The Microphone Volume control of the CU 4005/CU 4010 must be muted totally in this situation, since the mix of all signals is now done at the external mixer.

A set up with an external equaliser for sound equalisation of the built-in loudspeakers is possible by connection of the equaliser in a similar way.

Display function

The unit is switched on with the POWER (1) switch. (Please refers to the “Front panel controls” section). If more units are linked together for a larger system, it is advised to have an external common mains power switch for all central units.

After power ON the units are ready for operation after 20-30 seconds. The time is used for finding the number of central and microphone units, and setting up the system. It takes less time next time the same set-up is switched on. The LCD-display (6) will show:

CU Initializing 1.0	Menu:
	INITIALIZING

If more central units or microphone controllers are linked together, and one or more units are not switched on, the display can look like this:

CU Initializing 1.0	Menu:
Unit:4 NOT Powered	INITIALIZING

or

CU Initializing 1.0	Menu:
Previous NOT Powered	INITIALIZING

1.0 indicates that the software is version 1.0.

Note:

When the CU 4005/CU 4010 has the RS 4232 module built-in, this unit will count as two units.

After successful set-up time the LCD-display of the master CU will look like this:

Total Mic:125	Menu:
Vol: Inp=off Mic=-20	MASTER

Total Mic:125 indicates that there are 125 microphone units including chairman units connected in the system. *Vol: Inp=off* indicates input volume is totally muted, and *Mic=-20* indicates that the audio level of the microphone sound is attenuated with 20 dB.

The central unit, which have no other central units connected to the D9-connector *PREVIOUS*, will be MASTER or CU 0, and the first unit connected to the D9-connector *NEXT* will be SLAVE 1 or CU 1 and so on up to SLAVE 9 or CU 9 (if present).

The system will always function with the same settings of volume, mode, max. speakers and max. requests as those selected 10 seconds before the system was switched off.

The settings are stored in the master CU. If the order of the CU's is changed and a new one becomes master, then the settings of this unit (when it last was master) will be used.

All settings including volume settings will be written into EEPROM (Electrical Erasable Programmable Read Only Memory) after a period of no pressing of push buttons in 10 seconds. This ensures that the system has the same settings after a power down.

If Enter is pressed once, the display will show this:

<EXIT> TEST	Menu:
STATUS SETUP	MAIN

The markers < > shows the function which can be selected now with the *ENTER* button. **By using the buttons < or > the markers** < > can be moved respectively left and right.

The four choices in the Main menu are:

- **Exit**
- **Test**
- **Status**
- **Setup**

Exit

Returns to the Master menu.

Test

The following menu will appear:

<EXIT> TEST STEP	Menu:
CU0 Chain1 Mic1 Req	TEST

Here we can select between *TEST*, *STEP* and *EXIT*:

Test

The test function enables you to confirm that the control units have control of all the microphone units connected to the system.

To activate the function, place the < > markers around *TEST* and push the *ENTER* button. An automatic test of all the microphones is started beginning by setting microphone #1 in chain 1 on CU 0 in Request for 0,375 second. The text in the lower line on the display will look like shown above. Then the same microphone unit will be switched on for 0,75 second and the text *Req* changes to *Mic*. Then the next microphone unit will be set in request, switched on and so on.

After completion of testing all the microphones, the test starts from the beginning again. To stop testing, press *ENTER* again. If a faulty microphone unit (or perhaps a bad connection) is detected, the test will stop at that point.

To locate a possible fault, first check all connections in the chain of microphone units. Then activate the test function again. If a fault is still indicated, you need to remove microphone units

one by one in between new test cycles, until no fault is reported. In this way it is possible to locate a bad unit in the chain.

Note:

All microphones must be switched off before the test functions are activated. Otherwise the test functions cannot be started. If a button is pressed down on a microphone unit, while one of the tests is active; the test will stop, as this is recorded as an error.

Step

After the function is selected with ENTER, each microphone can be switched on one at a time by pushing the > button starting with the first microphone and stepping one up for every push. Pushing < will step backwards. The sign * will be shown in the display right to STEP. With this function you can check selected microphones for the audio quality for longer periods. The lower line of the display shows the same as above except for Req.

Exit

Pushing ENTER will always bring you back to display the previous menu ending up with the master display.

Status

The display will look like this, when *STATUS* is selected:

Chain1:25 Chain2:0	Menu:
Chair:1/2 Slaves:3	STATUS

Note:

CU 4005 has no possibility for use of chain 2.

This shows on the upper half how many microphone units are connected to the master on chain 1 (and chain 2). The line below it shows how many chairman microphone units are connected to the master / how many in the whole system. Also the number of connected slaves is shown.

If a fatal fault is present in a chain, and the central unit is incapable of recording the number of connected units, then the STATUS display will look like this:

Chain1:?? Chain2:25	Menu:
Chair:0/2 Slaves:3	STATUS

The two ?? replacing the number of units indicates an error, in this case on chain 1. Please observe that 51 or more microphones connected in one chain will result in an error as well.

Set-up

The SETUP menu looks like this:

EXIT <MODE> auto	Menu:
MAXSP 3 MAXRQ 50	SETUP

When MODE is selected by pressing ENTER as above, a cursor will appear at auto. The < and > buttons can now be used to scroll between the different function modes. When the CU's stand alone the mode auto or fifo can be selected by pushing ENTER.

At MAXSP (Maximum number of speakers) selected with ENTER, the maximum number of delegate microphones allowed to be ON can be selected. Use > and < to step the number up and down. It can be selected between 1 and 6. All chairman microphone units can always switch on. This setting has effect on all modes of operation.

If you wish to limit the Request To Speak queue, this can be done at MAXRQ as above. The maximum number of requests can be set between 0 and 999. This setting influences the manual and fifo modes. Note: If e.g. 10 mics. are already in request, setting the max.request to 4 will not delete any of these requests, but no further mics can be put in request before the queue is less than four.

When an MC 4000 Microphone Controller or a personal computer is connected to the system, it is also possible to select the mode manual and even customised modes. Is this the case, these selections

are made at the MC or PC. The display of the master will then look like this:

Total:125 PC/MC	Menu:
Vol: Inp=off Mic=-20	MASTER

This indicates that an MC 4000 Microphone Controller and/or personal computer is connected to the system. The STATUS display will then indicate manual.

Display, slaves

The LCD-display of the slaves will always look like this:

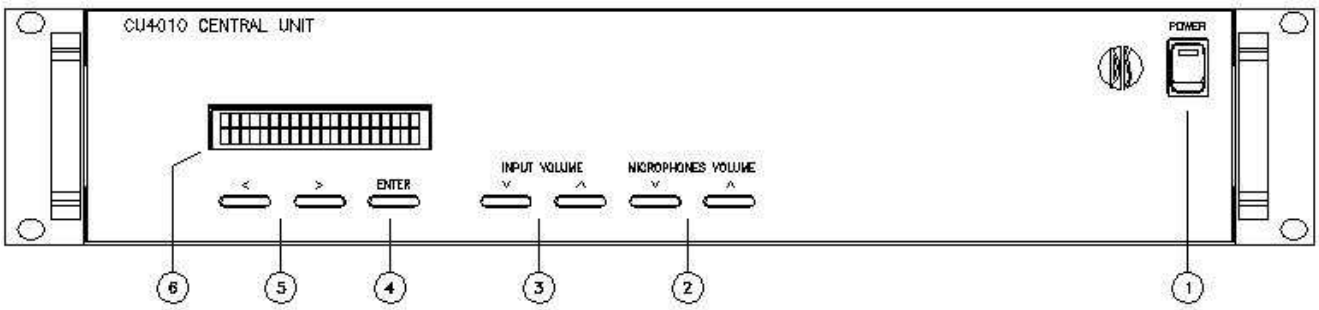
Slave:1 Chairmen:1	Menu:
Chain1:24 Chain2:0	SLAVE

This indicates, that this CU is slave #1, it has one chairman unit connected, it have 24 microphone units (incl. chairman) connected to chain 1, and there are no units on chain 2.

The push buttons have no function on the slaves.

Location and functions of controls

Front panel controls



1. Power On/Off

Power switch. The green light in the rocker switch indicates that the unit is ON.

2. Microphone Volume

The *Microphone Volume* buttons control the level of the microphone signal in the built-in speakers. The button marked ▼ will lower the microphone signal with 1 dB (decibel) for each short push and the button marked ▲ will raise the input signal 1 dB. If one of the buttons is pressed more than 1 second, the level will be changed in 1 dB steps four times a second, as long as the button is pressed. The level can be changed from +20 dB gain to -42 dB attenuation and off. A normal setting will be between -20 to +6.

3. Input Volume

The *Input Volume* button controls the level of an external signal from the *Input* connector at the rear panel in the same way as described above. The setting depends on the level of the actual input signal. It should be set to *off*, if the input is not used to prevent noise pick up.

Note:
The volume controls can always be used on the master, also if the display shows menus and the volume settings cannot be seen.

For more specific information about the volume controls refer to the schematic next page and the Set-up section under Operation.

4. Enter

This button is used to enter the menus and select a chosen value.

The markers < > around exit show the function which can now be selected with the *ENTER* button. If it is pushed again now, we will get back to the master (default) display shown above.

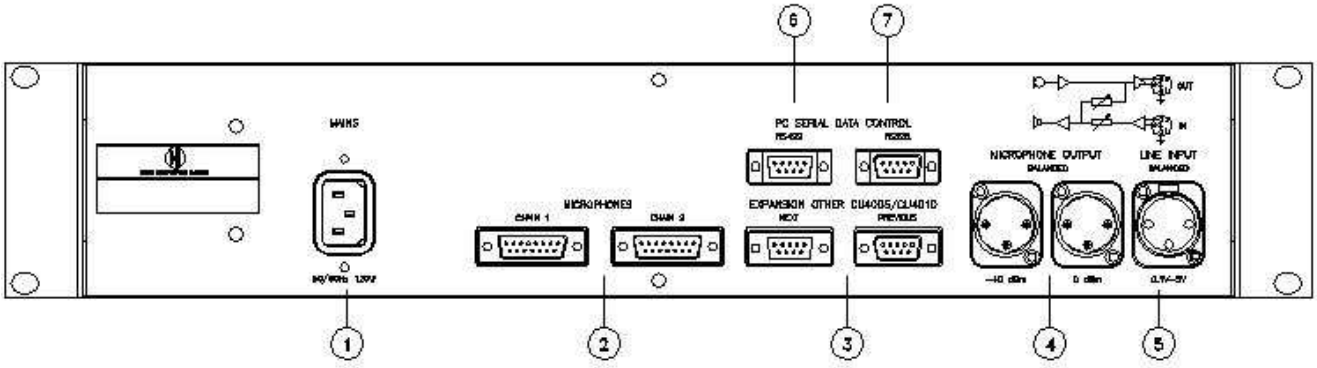
5. < and >

These buttons are used to step the markers < > left and right respectively for each push.

6. LCD Display

Indicates the setting of the system.

Rear panel connectors



1. Mains Connector

Connection for mains power. The unit can accept the following voltages: 110V/130V/150V/220V/240V/260V depending on the setting of the internal switch.

Before connecting the CU 4005/CU 4010 Central Unit to the mains, please check that the voltage shown on the label close to mains socket is in conformity with the voltage with which it is to be used.

2. Microphone Chain

Connector for the first DM/CM 4000 Unit connected in the chain. A maximum of 50 microphone units can be connected at a time.

3. Expansion of more CU 4005/CU 4010s

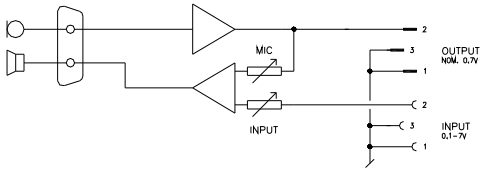
More central units are connected to these connectors for systems with more than 50/100 microphone units. The MC 4000 Microphone controller is also connected here. A maximum of ten CU 4005/CU 4010 units and two MC 4000s can be interconnected.

The central unit with none or only the MC 4000 connected to the PREVIOUS connector becomes the master unit.

4. Microphone Output

The output delivers the signal from the microphones independently of the Microphone Volume setting on the front panel. Also, the output is totally independent of the input signal.

The output signal is typically used for tape recording or an external PA-system and is nominal 0 dBm line-signal and –40dBm microphone level respectively.



5. Input

The input signal is mixed with the internal microphone signal by means of the Input Volume and Microphone Volume controls on the front panel. The resulting signal is then routed to the internal speakers in the microphone units.

The input is typically used for a wireless microphone or playback from a tape recorder.

6. RS 422 PC Serial Data Control (Optional)

Connector for personal computer or other equipment with RS 422 serial data communication. The equipment must have software compatible with the CDS 4000 system.

7. RS232 PC Serial Data Control (Optional)

Connector for personal computer or other equipment with RS232 serial data communication. The equipment must have software compatible with the CDS 4000 system. Both 6 and 7 can be used at the same time e.g. two computers.

Note:
Please note that there is no connection between the input and output of the CU 4005/CU 4010 unit, i.e. if you make a recording from the output of the unit, it will only be the signal from the delegate units you record. An input signal to the Line In on the CU 4005/CU 4010 will not appear at the output.

Installation instructions

Where to place

The CU 4005/CU 4010 unit can be placed on a table. Do not place anything on the unit as the unit will overheat and stop functioning correctly. If the unit has become overheated, turn Off the power, remove things that prevent proper ventilation and wait until it has cooled down. Then turn On again.

CAUTION: Do not remove rubber pads in bottom, as they are needed for proper ventilation.

The CU 4005/CU 4010 can also be installed in a 19"-rack using the holes in the brackets on each side.

CAUTION: It is important to have at least one blank 1HE-high front plate over and under the CU 4005/CU 4010 to keep sufficient ventilation.

Ventilators

It may be necessary to have ventilators in the rack over or under the unit(s) if e.g. two CU 4005/CU 4010 units are placed in the same rack. The ventilators are only needed to give a small amount of airflow up through the units. A blank 1HE-high front plate should also be placed between the two units.

Removing 19"-brackets

If the unit is placed on a table and the brackets are not used, then these can easily be removed. Screw out the two screws holding each bracket; remove the brackets and screw in the screws again. Be careful, do one side at a time as these screws also hold the cabinet together.

How to open the unit

Take out mains plug. Place the unit on a table. Remove the two upper screws in each side. Remove upper screw in the top middle of back plate. Now lift approx. 1.5 cm up the back of the top lid, so the inside bracket at the middle back of the lid is free of the back plate. Then slide the lid backward away from the front plate until the front bracket releases (approx. 2 cm). Remove top lid.

CAUTION: Never open unit with power cord connected. Do not operate unit with cover removed to avoid a potentially dangerous shock. If any trouble arises that cannot be rectified by external checking of the CU 4005/CU 4010 and

connected units, then you should approach your dealer or order service by qualified personnel.

Internal settings

Changing the voltage settings

Before connecting the CU 4005/CU 4010 Central Unit to the mains, please check that the voltage shown on the label close to mains socket is in conformity with the voltage with which it is to be used.

If any incongruity, do the following:

1. Switch off the unit and remove the mains power cable.
2. Open the unit (see section "How to open the unit).
3. The voltage selector is placed in the right side of the unit close to the front. Turn the selector with a coin and Select the voltage equal to or within +/- 10% to one of the following voltages shown on the rotating selector:

   110V - 130V - 150V - 220V - 240V - 260V
4. The primary fuses are located just below the selector; the same fuses are used for all settings.
5. Replace top cover and screws.

.

DM/CM 4xx0 units general

DM 4xx0 Series Delegate Units

The 4000 series microphones work in three different modes - *automatic (Auto)*, *first-in-first-out (fifo)* or *manual* - according to the settings of the system. If the CU 4005/CU 4010 is used without MC 4000 or personal computer, the operation mode is *automatic* or *first-in-first-out* (refer to section Modes of Operation).

Auto Mode

When pressing the *ON/OFF* button the microphone turns on. This is indicated by red light in the *speak* lamp. Pressing the button again will turn the microphone off.

Manual Mode

Pressing the *ON/OFF* button will place the microphone in the request queue of the MC 4000. This is confirmed by green light in the *request* lamp. It is possible to cancel the request by pressing the button again.

The microphone can only be switched on from the MC 4000 or personal computer, and this will be indicated by red light in the *speak* lamp. At this point the delegate can switch off the microphone by pressing the button.

First-In-First-Out Mode

The microphone unit functions in the same way as in *automatic* mode as long as the number of turned on microphone units is under or equal to the selected maximum speakers. When the max. number is reached, the next delegate pressing the *ON/OFF* button will be put in the top of the request

queue. This is indicated by the green *request* lamp (3) flashing slowly. More delegates will be put in the queue when they press their buttons, until the maximum of requests is reached. Their green lamps will light up steadily. When one of the turned on microphone units is switched off, the first microphone in the queue is automatically switched on, and the next in the queue will flash with the green lamp. This mode will normally be used with only 1 as maximum speakers.

Note:
When MC 4000 or a personal computer is not used, the request queue can only be deleted by pressing the ON/OFF button on all microphone units in request or by switching off the system.

CM 4xx0 Series Chairman Units

Pressing the *ON/OFF* button (1) will always turn the microphone on or off depending on the current state. Red light in the *speak* lamp (2) indicates that the microphone is on.

Manual and Automatic Modes

Pressing the *DELEGATE OFF* button (4) will turn off all delegate microphones. The *delegate off* lamp (3) will turn on shortly as confirmation.

First-In-First-Out Mode

Pressing the *DELEGATE OFF* button (4) will turn off all delegate microphones as long as the button is pressed. When the button is released, the delegate microphones will turn on again. This is used to interrupt a discussion between delegates for a short message from the chairman.

DM/CM 4410/4420/4450 Conference Units

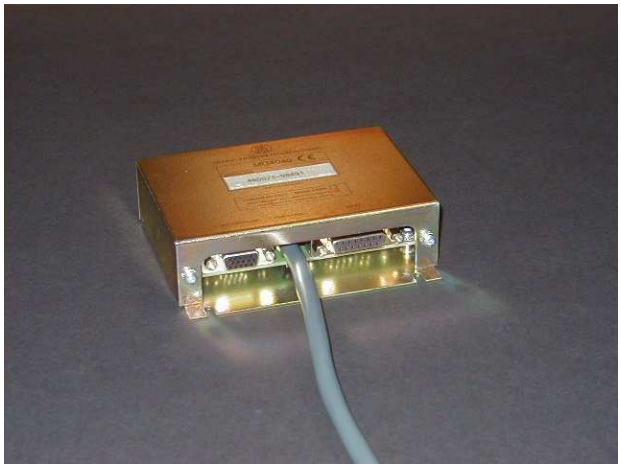
Setup

The 4400 series units have a built in easy snap locking mechanism in the bottom of the unit for fixing the chain connector.

Strain relief is provided by two parallel cable grooves provided with taps to secure the cable. The connection is thus invisible and the cables will run close together out of the rear of the unit.

For more permanent set up the cables can be lifted out of the groove and down through a hole cut in the table right underneath the unit.

MU 4040 Microphone Unit



Description

The MU 4040 Microphone Unit is designed for hidden installation, e.g. in an armrest, under a table or in a floor box.

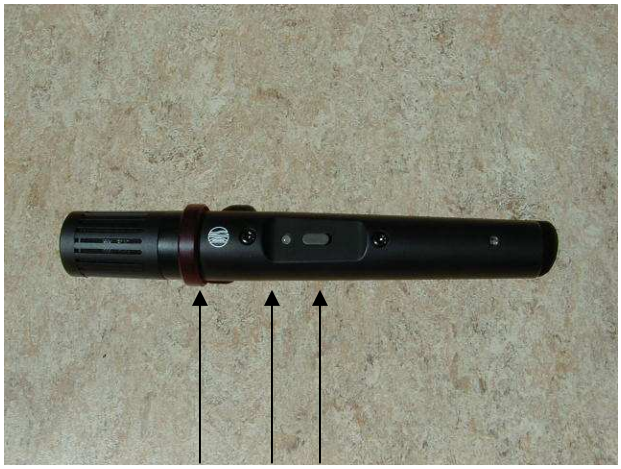
The MU 4040 is set-up similar to the other DM/CM 4000 Series Units. The MU 4040 operates in the same modes as described for the DM/CM 4000 Series Units.

The MU 4040 is provided with a fixed cable for daisy chain connection to the back of the previous unit, a connector for connection for the next MU 4040 unit and a HD15S connector. The HD15S is used for direct remote connection of: Microphone (e.g. HM 4042, GM 64xx in external outlet), microphone control buttons, LED indicators and loudspeaker.

The MU 4040 may also be used to switch on and off a loudspeaker in a loudspeaker system with separate amplification (e.g. a 100V system) via an external relay.

The MU 4040 is designed for fixed mounting by four screws.

HM 4042 Hand Microphones



3. 2. 1.

HM 4042 shown with cable

Description

The HM 4042 Hand Microphone is designed for use with the MU 4040 unit. The microphone is equipped with ON/OFF button as well as an indicator..

The HM 4042 must be connected to the HD15S connector on the MU 4040 unit.

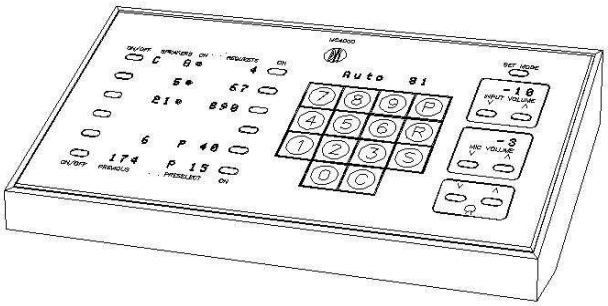
Controls

1. When the HM 4042 Hand Microphone is connected to the HD15S connector, the function of this button is the same as the *ON/OFF* button on the Delegate/Chairman unit..
2. This indicator lights red when the microphone is ON and green when in request, but only if the HM 4042 is connected to the HD15S connector..
3. This ring indicator lights red when the microphone is ON

System enhancement

MC 4000 Microphone Control

Description



The MC 4000 Microphone Control is a compact desktop switchboard designed for the CDS 4000 system. It is used as an operating switchboard to control the connected Delegate/Chairman units.

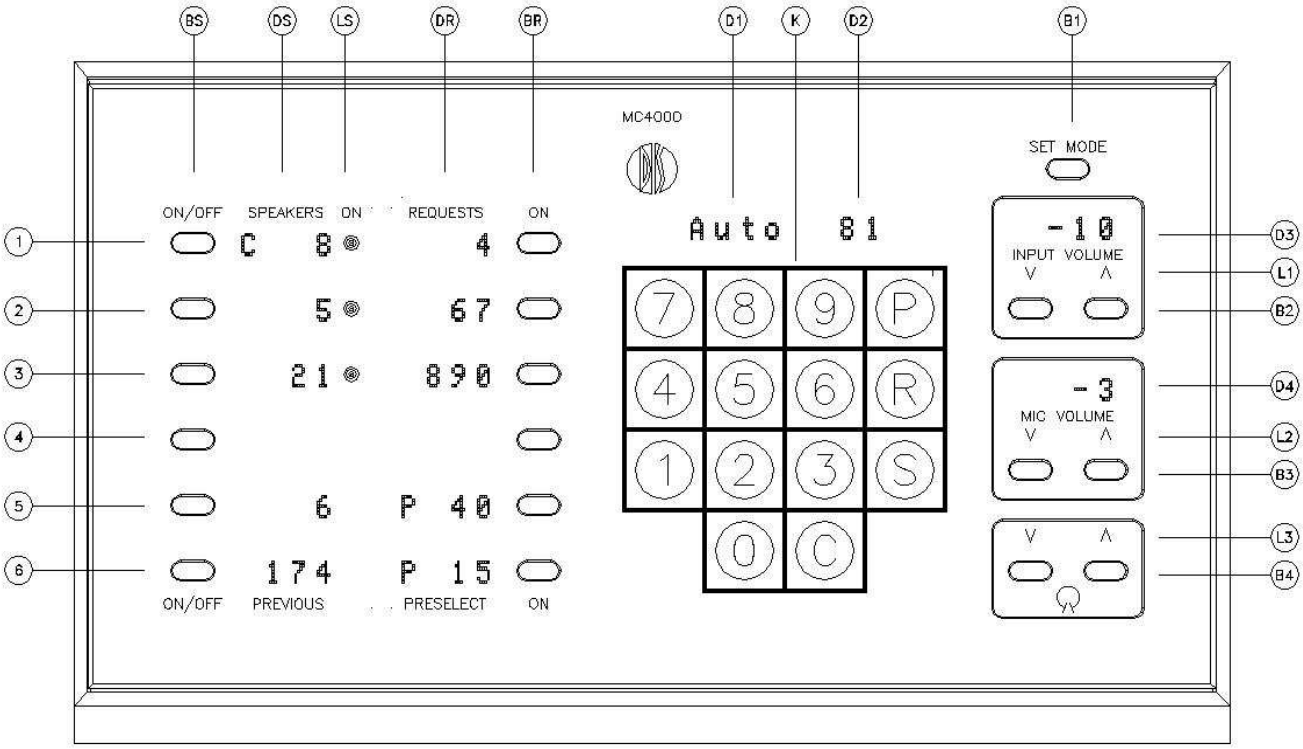
In manual, fifo and automatic mode, all microphones can be controlled individually by the MC 4000.

For automatic, fifo and manual operation the MC 4000 provides auto updating of the Speaker's display and in manual mode the Request display as well.

MC 4000 features:

- TEN KEY PAD CONTROL WITH DISPLAY of any microphone unit switched to any operating status.
- SINGLE BUTTON CONTROL of microphone units displayed in Speak, Request, Pre-select or Last Speaker mode.
- MODE DISPLAYS. Displays of the operating modes AUTO, FIFO MAN or CUSTOM plus TEST and PROGRAM modes. Display of total number in Request, Display of Input & Mic. Volume or Max. Req. & Max. Spk. settings.
- HEADPHONE OUTPUTS. Three sockets available. One for 1/4 inch. jack plug and two for 3.5 mm jack plug.
- TWO COLUMN DISPLAYS for display of microphone number, microphone status ON/OFF of Pre-select and Chairman status.
- VOLUME CONTROLS for conference unit's loudspeaker level and headphone output level with display of level settings.
- COMPACT DESIGN. Two MC 4000 units can be connected to a system. The MC 4000 is connected anywhere in the control link.

Location of controls



Start-up

The MC 4000 Microphone Control unit is powered from the CU 4005/CU 4010 Central Unit via the Control Link Bus, and the MC 4000 unit will power on, when one or more of the CU 4005/CU 4010 units are powered.

On Power Up the MC 4000 displays a start-up message "MC INIT v1.0" in displays D1, D2 and D3, which tells the operator that the unit has entered the initialising sequence in which the CDS 4000 units automatically configure the system and establish the needed logical connections between units. The software version of the MC 4000 is also displayed in the start-up message - v1.0 tells the operator that this MC 4000 is running the software version 1.0.

Standard Operations mode

Upon completion of the initialization sequence the MC 4000 enters Standard Operations mode.

D1 displays the Master CU mode, which may be one of the following AUTO (Automatic mode), FIFO (FIFO mode) or MAN (Manual mode). For an explanation of these modes please refer to the section “Modes of Operation” of this manual.

D2 displays the current number entered via the numerical keypad, but following initialization D2 will display the total number of microphones present in the system. This information confirms to the operator that all microphones are connected in the system. The display will be cleared when any button on the MC 4000 panel is pressed.

D3 displays the current setting of the Input Volume on the Master CU (In dB). This volume may be

changed using the B2 buttons respectively to decrease and increase the Volume in steps of 1 dB.

D4 displays the current setting of the Microphone Volume on the Master CU.

This volume may be changed using the B3 buttons respectively to decrease and increase the Volume in steps of 1 dB.

The Headset Volume may be changed using the B4 buttons respectively to decrease and increase the Volume in steps of 1 dB. The current volume setting of this volume is not displayed on the MC 4000.

The 6 DS displays show the microphone numbers of up to 6 current or previous speakers. The current speakers are listed in the top positions with the LED's LS lit next to the microphone number. If more than 6 microphones are switched on, only 6 of these are displayed - the delegate microphones are always displayed (no more than 6 delegate microphones can be switched on at a time) and as many chairmen microphones as possible are displayed. Chairmen microphones are distinguished from delegate microphones by the letter 'C' preceding the microphone number (e.g. "C 21"). If 4 microphones or fewer are in speak, the DS displays are also used to display previous speakers. To distinguish previous speakers from currently active speakers a display is blanked between the bottom of the speaker list and the top of the previous speaker's list, and furthermore the LED's LS next to the previous speakers are NOT lit. The buttons BS next to each display are used as short cuts to switch these microphones ON or OFF. If a microphone is currently switched on the BS button next to the microphone number will turn the microphone off and vice versa.

The 6 RS displays show the top of the Request list and/or Pre-selected microphones. The microphones in the top of the request queue are listed in the top display positions, and the pre-selected microphones are listed in the bottom display positions. If 6 microphones are pre-selected, pre-selected microphones will occupy all the displays and the request queue will not be visible. The pre-selected microphones are distinguished from microphones in the request queue by the letter 'P' preceding the microphone number (e.g. "P 15"). The buttons BR next to each display are used as short cuts to switch these microphones ON. A microphone switched on from the request queue will be removed from the request queue, whereas a pre-selected microphone switched on will remain in the pre-selected list.

The numerical keypad ('0'-'9') is used to enter the current microphone number displayed in D2.

The 'P' key is used to put the current microphone displayed in D2 in pre-select, or to remove the current microphone from the pre-select list if the microphone is already on the list. If the current microphone number is 0, pressing the 'P' key will cause the MC 4000 to display the total number of microphones present in the system in displays D1 and D2 as long as the 'P' key is depressed (e.g. "#Mic 332").

The 'R' key is used to put the current microphone displayed in D2 in request or to remove the microphone from the request queue if the microphone is already present in the queue. If the current microphone number is 0, pressing the 'R' key will cause the MC 4000 to display the total number of microphones in the request queue in displays D1 and D2 as long as the 'R' key is depressed (e.g. "#Req 25").

The 'S' key is used to put the current microphone displayed in D2 in speak or to remove the current microphone from the speaker's list if the microphone is already in speak.

The 'C' key is used to clear the current microphone number displayed in D2. The 'C' key is also used in conjunction with the 'P', 'R' and 'S' keys to further enhance keypad operation. If the 'C' key is held depressed, pressing the 'P' key will clear the pre-select list. Pressing the 'R' key will clear the request queue, and pressing the 'S' key will switch off delegate microphones currently in speak (chairmen microphones will not be affected).

Pressing the SET MODE (B1) button will change the MC 4000 mode of operation from normal mode to system settings mode.

System Settings Operation mode

This mode of operation is used to monitor/change the system settings for the microphone system, and to enter the two special purpose modes Test Operation mode and Program operation mode. From the system setting mode it is not possible to change the volume settings (Input, Microphone or Headset) as the buttons/displays used for controlling the volume settings in normal operation mode are transferred in this mode to provide additional functionality. It is still possible to fully operate the microphones (switch ON/OFF, monitor request list, etc.)

A LED bar next to the D3 display will light up with the text MAXR indicating that the D3 display is now used to display the maximum number of delegate microphones allowed in the request queue (e.g. "R 50"). This system setting can be changed from the B2 buttons (respectively decrement by one and incremented by one), but the new setting will not be effective before the MC 4000 mode of operation is changed back to normal operation mode.

A LED bar next to the D4 display will light up with the text MAXS indicating that the D4 display is now used to display the maximum number of delegate microphones allowed to speak simultaneously (e.g. "SPK3"). This system setting can be changed from the B3 buttons (respectively decrement by one and incremented by one), but the new setting will not be effective before the MC 4000 mode of operation is changed back to normal operation mode.

Next to the B4 buttons a LED bar will light up with the text MODE indicating that these buttons are now used for changing the mode of the microphone system or MC 4000 microphone controller as indicated in the D1 display. Pressing one of the buttons, the selection is switched between AUTO, FIFO, MAN, TEST and PROG. AUTO, FIFO and MAN indicate the mode of the CU 4005/CU 4010 as described in the CU 4005/CU 4010 section of this manual, whereas TEST and PROG indicate modes of operation applying solely to the MC 4000 microphone controller. If the mode displayed in the D1 display is changed, the new setting will only be effective after the SET MODE button is pressed.

The SET MODE button is used to change the mode of operation of the MC 4000 microphone controller back to Normal mode of operation (if the mode shown in D2 is either AUTO, FIFO or MAN) and effectuate the changes made in the system settings MAXS and MAXR. If the mode shown in D2 is TEST or PROG, the SET MODE button is used to change the MC 4000 mode of operation to this mode. Note that it is only possible to change the MC 4000 mode of operation to TEST mode when there are no microphones in speak or request. When changing the MC 4000 mode of operation to PROG (programming mode), a message "To enter PROGRAM mode press P" is displayed prompting the operator to confirm this selection before programming mode is entered. Pressing the 'P' key will cause the MC 4000 to enter programming mode whereas pressing any other key will return the MC 4000 mode of operation to normal operation mode.

Test Operation mode

This mode of operation is used to test that the microphone system is fully operational and that the sound quality of the microphone capsules is acceptable. This mode is also used to verify that all microphones are numbered correctly. Note that it is not possible to control the microphone system normally in test operation mode.

The keys 'P', 'R' and 'S' that are normally used to switch microphones on, off, in request or pre-select are not operational in this mode.

The different volumes (input, microphone and headset) are displayed and controlled normally in test operation mode.

The top four positions of the DS displays are used normally to display the number of the microphone

currently in speak. DS5 displays the text "RUN" indicating that the BS5 button is now used to start an automatic test of the microphones. When the MC 4000 is running an automatic test of the microphones, the led LS5 is lit, and the microphones are sequentially put in request and speak. DS6 displays the text "PREV" indicating that the BS6 button is now used to switch on the microphone preceding the microphone currently in speak. It is only possible to use the previous button when the MC 4000 is not running the automatic test sequence.

DR5 displays the text "NEXT" indicating that the BR5 button is now used to switch on the microphone following the microphone currently in speak. It is only possible to use the next button when the MC 4000 is not running the automatic test sequence.

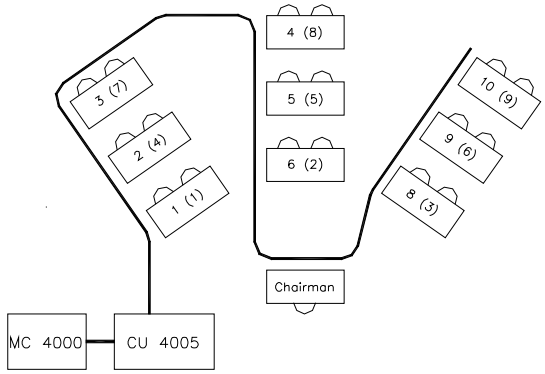
The SET MODE button is used to leave the test operation mode and return the MC 4000 to normal operation mode.

Program Operation mode

This mode of operation is used to assign logical numbers to the microphones in the system.

Giving the individual microphones numbers it is necessary to make a distinction between the physical microphone number and the logical microphone number. The physical microphone number is given automatically to each microphone by the system depending on the connection of the individual microphone in the system. The first microphone connected to chain 1 on the master CU has the physical number 1; the second microphone connected to this chain has number 2, etc. The microphones connected to chain 2 on the master CU has the physical numbers 51,52 ... (Note that this applies regardless of how many microphones are connected on chain 1). The microphones connected to slave CU number 1 chain 1 are numbered 101,102 ... and slave CU number 1 chain 2 are numbered 151,152...

This numbering system applies to all slave CU's in the system - the first microphone on slave number 9 chain 1 has number 901. In order to ease the remote control of the microphone system it is possible for the user to assign new numbers to the individual microphones. These numbers are called logical numbers and are not depending on the connection of the microphones in the system. When the MC 4000 is operated in the normal operation mode the logical numbers are used to control the system, thus enhancing the operation of the microphones by hiding the cabling of the system from the operator.



The connection between physical and logical numbers is established in the programming mode by the operator and preserved during power off. The programming described here will normally only have to be done once upon installation of a permanent microphone system. If more than one MC 4000 panel is used, it is possible for the two MC 4000 panels to operate with independent conversion tables (this is not recommended).

The keys 'P', 'R' and 'S' that are normally used to switch microphones on, off, in request or pre-select are not operational in this mode.

The different volumes (input, microphone and headset) are displayed and controlled normally in program operation mode.

DS1 displays the text "↓PHY" indicating that the column of microphone numbers in DS2-DS5 refer to the physical microphone numbers and that pressing the BS1 button will scroll the view of the list down one position. DR1 displays the text

"↑LOG" indicating that the column of microphone numbers in DR2-DR5 refer to the logical microphone numbers, and that pressing the BR1 button will scroll the view of the list up one position. The two lists are connected so that the microphone identified by the physical microphone number displayed in DS2 has the logical microphone number displayed in RS2 and so on.

To change the logical number for a microphone use the up or down keys BS1 and BR1 to move the physical microphone number into the view of the list. Entering the physical microphone number via the numerical keypad and then pressing one of the buttons BS2-BS5 can also move the view of the list. The physical microphone number will now be placed in the position next to the BS button that was pressed. When the physical microphone number is in the view of the list, this microphone can be assigned a new logical microphone number by entering the logical number via the numerical keypad and then pressing the BR button next to the microphone number. Note, if a given quantity of microphones (e.g. 50) is connected to the system, the logical numbers are NOT limited to the numbers 1-50, any logical number in the range 1-999 can be associated with the physical microphone numbers. Also note that it is not possible to assign the same logical microphone number to two different physical microphone numbers. Any assignment of a logical microphone number that has already been used by another physical microphone number will simply cause these two physical microphone numbers to exchange the assigned logical microphone numbers - this approach achieves the goal that it is not possible to generate an invalid conversion table. All physical microphone numbers have a logical microphone number assigned at any time, and this logical number is always different from the logical numbers assigned to all the other physical microphone numbers.

DS6 displays the text "SORT" indicating that the button BS6 is used to change the way the list is sorted. The list can be sorted according to the physical microphone numbers (the led LS6 is NOT lit), or the list can be sorted according to the logical microphone numbers (the led LS6 is lit). The mode of sorting is toggled when the BS6 button is pressed.

DR6 displays the text "RENR" indicating that the button BR6 is used to automatic renumbering of the microphones. When the button BR6 is pressed the displays D1 and D2 displays the message "To renumber with CONSECUTIVE numbers press S - To renumber with PHYSICAL numbers press P" is displayed, prompting the user to select the way the microphones are assigned logical numbers. If consecutive numbering is selected, the microphones will be renumbered with consecutive numbers. If there are 35 microphones on the master CU chain 1, these will be assigned logical numbers identical to the physical numbers 1,2,... 35, the microphones on master CU chain 2 will be assigned numbers 36,37 ... and so on, thus eliminating any unused microphone numbers. If physical numbers are selected, the microphones will be assigned logical numbers identical to the physical number of the microphone. Pressing any other key than 'S' or 'P' will stop the automatic renumbering.

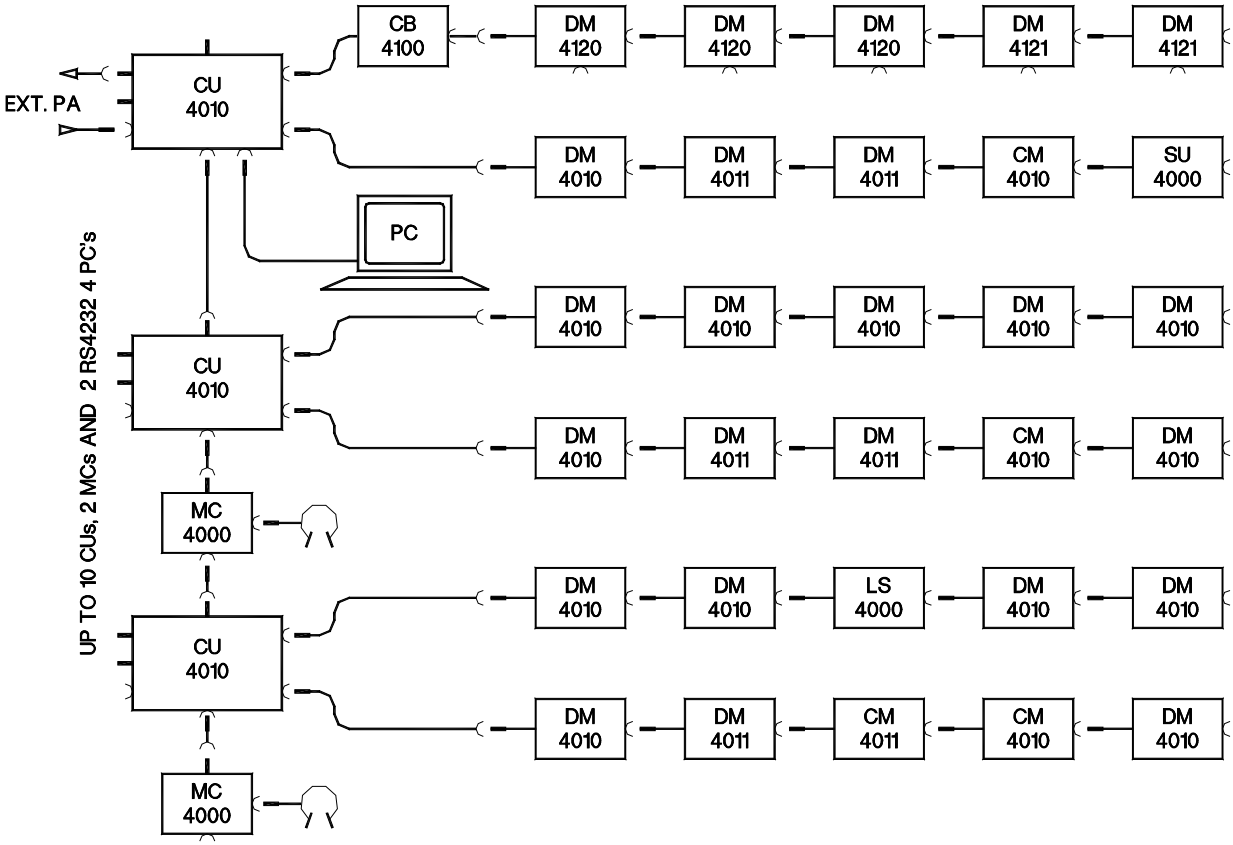
The SET MODE button is used to leave the programming mode. When the SET MODE button is pressed, the message "To UPDATE Conversion Table press P - To EXIT with NO UPDATE press C" is displayed prompting the user to either update the conversion table according to the programming or to loose the changes in the conversion table and keep the old conversion table intact. Pressing any other key than 'P' or 'C' will cause the MC 4000 to remain in programming mode.

Error detection feature

If any microphones are connected to or disconnected from the microphone system during operation, a warning message will be displayed on the MC 4000 microphone controller alerting the operator of the microphone chain, which was affected. If a microphone is disconnected from the master CU chain number 2 the following message will be displayed; "An ERROR has occurred on

CU# 1 CHAIN# 2". This will help the operator to quickly identify the error and correct it. This error message will keep displaying until any key is pressed.

Setting up a large system



The central units are interconnected with the control link cables in the D9-connectors NEXT CU 4005/CU 4010 and PREVIOUS CU 4005/CU 4010.

The first unit becomes MASTER and the others will be SLAVES. A maximum of ten CU 4005/CU 4010s can be linked together. Volume control and set-up for the system can only be done on the master or with MC 4000 Microphone Controller and personal computers (RS 4232).

Connection of the microphone units in the chain is done in the same way as described above for the CU 4005. The CU 4010 allows connection of 100 microphone units, but please note that each chain can control a maximum of 50 units. A maximum of ten CM 4000 Chairman Units can be used in the system. They can be positioned anywhere in the different microphone chains.

One or maximum two MC 4000 Microphone Control units can be connected anywhere in the D9 control link, i.e. between central units, at the first and/or last unit. Do not, however, connect two MC 4000s in the same end of the control link without separate power supply for one of the MC 4000

units. If two MC 4000 units are connected to one central unit, a separate power supply is needed.

Up to four personal computers or other equipment with RS232 or RS 422 communication ports can be connected to the system for monitoring (e.g. name handling for the microphones) or control of the system. An RS 4232 module shall then be built-in to any one of the central units. A suitable program that can communicate with the system is needed. A maximum of two RS 4232 modules are allowed in one system, thus providing connection of up to four personal computers.

SW 4200/4210/4220 System Control Software

See SW 4200 Operators Manual

Installation guide

General installation rules

Standard portable units

Standard microphones MU 4040 and DM/CM 44xx:

- Always use DIS-type extension cable (special product cable) to obtain full performance of the system. Only DIS-type cable can be used.
- The maximum cable length between any two units connected together is 100 m.
- The total cable length in one chain must not exceed 200 m (which includes the 2 m cable on each portable unit).
- The units in each chain must be connected one after the other (daisy chain), i.e. it is not allowed to make star point configuration.
- Always switch off the main power on the central unit before removing or adding units to the chain. Omission to do this might damage the connectors.
- Keep the length of all cables as short as possible to maintain high audio quality and low noise operation.
- Avoid having a cable connected to the system, when there is not a unit (DM 4xxx or CM 4xxx) connected in the other end. The open cable with no termination might cause problems for the data transmission and pick up audio noise.

The total cable length of a chain can be extended to up to 300 m, but this might cause a slight drop in audio performance: A slight raise in cross talk from data-signals and possibility for clipping of very high audio due to drop in power supply voltage.

Control Link Cables

- Use standard flexible cable 4x2x0,25 mm^2 with screen.
- The total cable length must not exceed a length of 300 m.
- The units must be connected one after another (daisy chain); i.e. it is not allowed to make star point connection. Always have a male connector in one end and a female in the other end.
- Always switch off mains power on all central units (CU 4005/CU 4010) before removing or adding MC 4000 or CU 4005/CU 4010. Omission to do this might cause damage to the connectors.
- All CU 4005/CU 4010 units (and MC 4000 units) must be powered or the system will not start up.
- Avoid having a control link cable connected to the system, when there not is connected a unit (CU 4005/CU 4010 or MC 4000) in the other end. The open cable with no termination might cause problems for the data transmission and pick up audio noise.

MC 4000 Microphone Controller

- The maximum number of MC 4000 units in a system is two.
- The cable length between any CU 4005/CU 4010 and an MC 4000 must not exceed 50 m using 4x2x0,25 mm^2 cable.
- With 0,5 mm^2 cable (for 0V and +15V) this can be raised to 75 m.

- Or instead use an external +12V - +15V/@ 12VA power supply close to the MC 4000. The +15V supply in the cable(s) from the central unit(s) must be cut. See drawing 4.6-90 in the appendix for connection of this.
- One CU 4005/CU 4010 can only power one MC 4000. If two are needed, one unit must have external power supply (see above).
- If two MC 4000 units are needed in the end of the control link, the last MC 4000 must have external power supply (see above).
- It is possible to have an MC 4000 in both ends of the control link. But the MC 4000 connected to PREVIOUS (of the preceding CU 4005/CU 4010) must be connected to its female connector in the bottom of the unit. The cable with the male connector can be rolled up, or it can be removed from the unit:

  Take off the bottom parts of the unit (6 screws. Note their sizes).

  Cut off the plastic strips holding the cable and pull out the cable plug.

  Replace bottom parts and screws.
- The MC 4000 have two M4 holes in the bottom for fixation of the unit on a table. Note that the screws (M4) only can go approx. 5 mm into the unit.
- The MC 4000 can also be flush mounted in a table: Remove bottom parts and sides of the unit. (See above.) There is a hole in each corner of the metal front plate (under the acrylic front). Use these for centre marks and drill four holes from the backside. Take care not to burst the rim of the holes in the acrylic front. It is recommended to counter sink the screws in the front and to use black counter sunken screws. Can be ordered from DIS.

RS 4232 Serial Communication Module

- A maximum number of two RS 4232 modules can be installed in a system. The module is easily installed inside the backside of the CU 4005/CU 4010. Any two CU 4005/CU 4010 units in a system can have a module built in.
- Both the RS232 and the RS 422 serial ports can be used simultaneously. A maximum of four external computers or other serial devices can thus be connected to a system. If only a single CU 4005/CU 4010 is present, the maximum number is two serial devices (one RS232 and one RS 422).
- **NOTE:** Both ports use a data rate of 9600 baud, 8 bits, No Parity and 1 stop bit. The RTS/CTS handshake signals are in use.
- RS232 cables should not be much longer than 10 m (max. 20 m).
- For RS232 a flexible cable of minimum 5x0,25 mm^2 (min. 5 leads) with screen is recommended.
- RS 422 cables can be up to 1000 m.
- For RS 422 a flexible cable of 5x2x0,25 mm^2 (min. 5 pairs) with screen is recommended.

CU 4005/CU 4010 Central Units

- The central units can be placed on a table or in a 19-inch rack.
- Do not stack more than two units on a table.
- Do not remove rubber feet.
- There should be adequate ventilation, when placed in a rack. Have one height unit between each central unit, and one height unit under the bottom unit and over the top unit. Forced ventilation might be necessary; and there must be free airflow through the ventilating holes of the central units.

- A common power switch is recommended in the front of the rack for a larger system.
- Make sure to have enough power for the system. 200VA for each CU 4005 and 300VA for each CU 4010.
- Remember to check and set mains voltage selector correctly.

Accessories

Microphone extension cables

In the CDS 4000 system extension cables can be used at any place in the chain of microphone units - between main unit and microphone units as well as between individual microphone units. However the installation guide provided in this manual must be followed.

Extension cables can be delivered in accordance to the table below:

Item	Order No
EC 4000-01, Cable 1m complete with male and female connectors	15 51 37161
EC 4000-02, Cable 2m	15 51 37171
EC 4000-05, Cable 5m	15 51 37181
EC 4000-10, Cable 10m	15 51 37191
EC 4000-20, Cable 20m .	15 51 37201
CA 4000-100, Bulk Cable (100m)	15 52 04699
CO D15 M, Connector 15P D-SUB male w/cap+lock for soldering	15 52 03009
CO D15 F, Connector 15S D-SUB female w/cap+lock for soldering	15 52 03008

Control link cables

These cables can be used to link several CU 4005/CU 4010 Central Units and MC 4000 Microphone Control units together. They have a male D9 connector with finger screws in one end and a female D9 connector with finger screws in the other end. The cable is a standard flexible 4x2x0,25mm^2 with screen.

The cables can be delivered in accordance with the table below:

Item	Order No.
EC 6232-01, Cable 1 m complete with male and female connectors	15 51 05563
EC 6232-02, Cable 2 m	15 51 05564
EC 6232-05, Cable 5 m	15 51 05565
EC 6232-10, Cable 10 m	15 51 05566

PC cable

This cable is used to connect the CU 4005/CU 4010 to a PC

Item	Order No.
EC 4232-05, Cable 5 m	15 51 05611

Hand microphone accessories

Item	Order No.
EC 4004-02, Spiral (coiled) Cable -2 m, 6 pin XLR female x 15 pin HD-Sub male between HM 4042 and MU 4040	18 11 04766
EC 4006-03, Straight Cable – 3 m, 6 pin XLR female x 15 pin HD-Sub male between HM 4042 and MU 4040	18 11 05988
AC 4042, Clamp for HM 4042 Hand microphone	18 11 03068

Transportation

Item	Order No.
SB 4400, Plastic box with foam for 5 pcs. Portable Microphone units, models: DM/CM 4410 P, DM 4420 P	18 24 05665
SB CU, Plastic box with foam for one 19" unit of the models: CU 4005/10	13 09 05527
DO 12, Dolly with four wheels for 10 boxes	E0 01 00300

Specifications

Electrical

CU 4005/CU 4010 Central Unit

Microphone capacity:

CU 4005	50 units in one chain
CU 4010	100 units in two chains

Frequency response:

Mic. in to Line out	35Hz-19KHz
Mic. in to LS out	100Hz-13KHz
Line in to LS out	130Hz-13KHz

Distortion:	< 0.1%
S/N ratio:	> 66dBA (include. mic. ampl.)

Line Input:

Impedance:	40 kOhm, Balanced
Input level:	Adjustable 100 mV-1,55 V
Max. input level:	+20 dBm (8V)
Connector:	XLR3S

Microphone Output:

Load :	>600 Ohms
Level:	0 dBm (0,7V) + -40dBm (7mV)
Frequency:	35 Hz - 19 kHz
S/N ratio:	> 66 dBA (include. mic. ampl.)
Distortion:	< 0,1 %
Connector:	XLR3P x 2

.

General

Power requirement

CU 4005/10 110/130/150/220/240/260 V AC
50/60 Hz

DM/CM 4xx0, MC 4000

Supplied from CU 4005/CU 4010

MC 4000 +12V - +15V/12VA

Power consumption

CU 4005 150W maximum

CU 4010 300W maximum

Temperature range

Temperature to guarantee specified performance:

5 Deg C. to 40 Deg C. (35 to 80% humidity)

Storage temperature

-20 Deg C. to 60 Deg C. (10 to 80% humidity)

Weight

CU 4005	8.9 kg
CU 4010	10.6 kg
MC 4000	1.3 kg
DM/CM 4410 P	0.96 kg
DM 4420 P	0.89 kg
DM/CM 4450 P	0.99 kg

Accessories supplied

AC power cord for CU 4005/CU 4010

Design and specifications are subject to change without notice.

Dimensions

Note: All dimensions are in millimetres.

DM/CM 4410 P Delegate/Chairman Unit

W ∗ H ∗ D, (mm): 150 ∗ 400 ∗ 171 mm

Note: Measured with vertical gooseneck.

DM/CM 4450 P Delegate/Chairman Unit

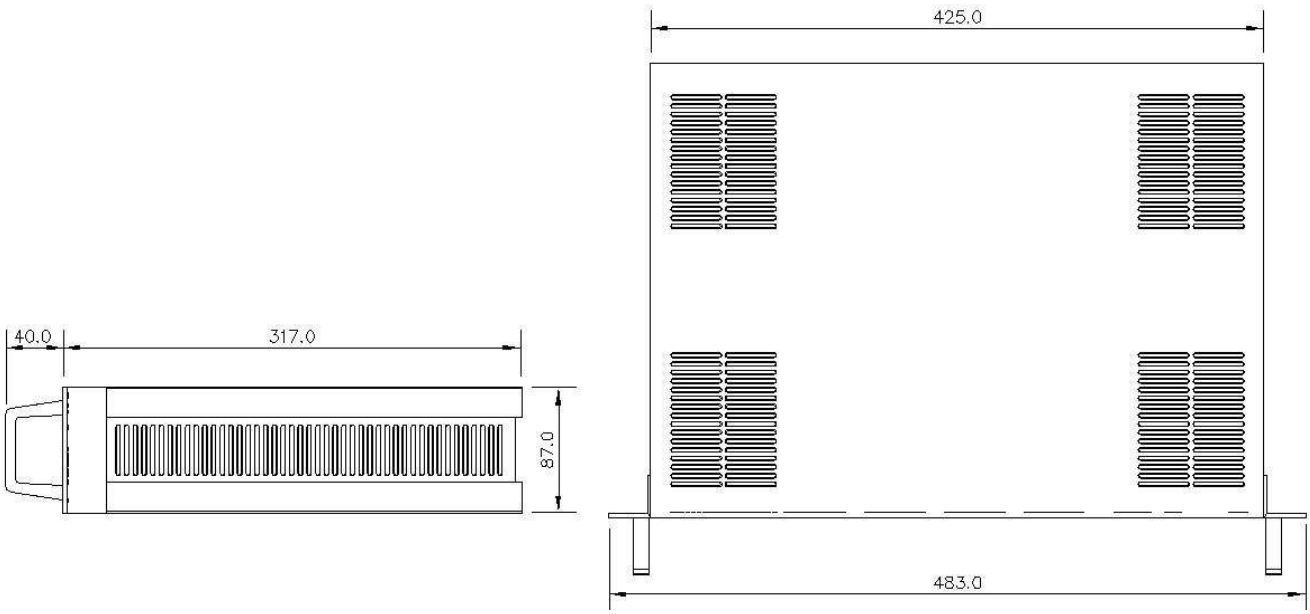
W ∗ H ∗ D, (mm): 150 ∗ 540 ∗ 171 mm

Note: Measured with vertical gooseneck

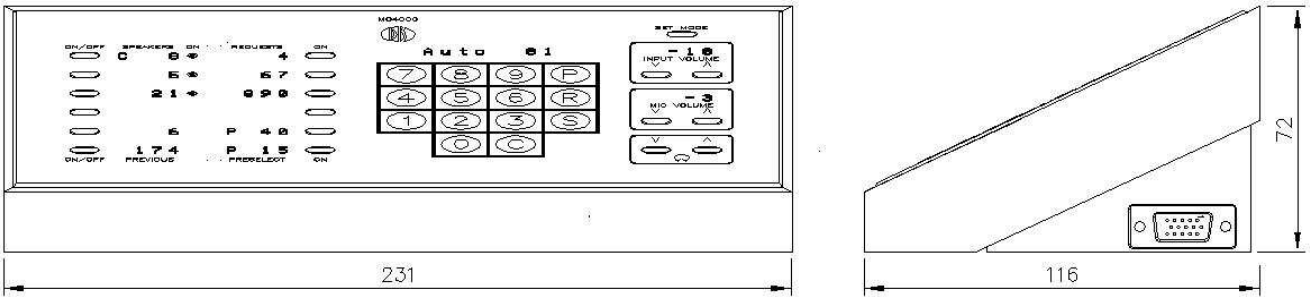
DM 4420 P Delegate/Chairman Unit

W ∗ H ∗ D, (mm): 150 ∗ 73 ∗ 171 mm

CU 4005/CU 4010 Central unit



MC 4000 Microphone Control



Pin assignments

CU 4005/CU 4010

Line in (XLR3 female) / Microphone output (XLR3 male)

Pin	Signal	Cable type
1	Ground	2 x 0,25 mm^2 shielded.
2	In phase signal	
3	Out phase signal	

Each in/output is electronically balanced

Mic. Chain connector (D15 female)

Pin	Signal	Cable type
1	+MIC	DIS type EC4000-xx only.
2	0V	
3	+15V	
4	+LS (50V)	
5	Data in	
6	Latch	
7	0V	
8	+15V	
9	-MIC	
10	+15V (analogue)	
11	-15V	
12	-LS (50V)	
13	-Data out	
14	Clock	
15	0V	

Control link connector (D9 F / D9 M)

Pin	Signal	Cable type
1	+MIC	DIS type EC 6232-xx or 4 x 2 x 0,25 mm^2 shielded
2	NEXT/PREVIOUS	
3	+OUT	
4	+DATA	
5	0V	
6	-MIC	
7	+15V	
8	-OUT	
9	-DATA	

RS232 connector

Pin	Signal	Cable type
1		DIS type EC 4232-05 or 4 x 0,14 mm^2 shielded
2	RxD	
3	TxD	
4		
5	0V	
6		
7	RTS	
8	CTS	
9		

RS 422 connector

Pin	Signal	Cable type
1	+CTS	4 x 2 x 0,25 mm^2 shielded
2	+RxD	
3	+TxD	
4	+RTS	
5	0V	
6	-CTS	
7	-RxD	
8	-TxD	
9	-RTS	

MU 4040

Input (HD15S)

Pin	Signal	Cable type
1	- Loudspeaker output	DIS type: #2029 or according to the specific installation.
2	Speak LED	
3	Request LED	
4	ON/OFF switch input	
5	Delegate OFF switch	
6	MU 4040: +Relay	
7	+ Loudspeaker output (4 ohm)	
8	Phones output	
9	N.C.	
10	+ lamp	
11	+15V	
12	0V	
13	MIC ground	
14	+ MIC	
15	N.C.	

Accessories (not supplied)

- Extension cables for DM/CM units.
- Cable set for interconnecting two CU 4005/CU 4010 Central units.
- GM 64xx Gooseneck Microphones.
- HM 40xx Hand Microphones
- Headphones.

External Control of the CU 4005/CU 4010

General

Data is sent using a rate of 9600 baud, 8 bits, No Parity and 1 stop bit. The RTS/CTS handshake signals are in use. The RS 4232 card has two serial ports - one RS232 port and one RS 422 port, which may be used simultaneously.

The messages to and from the RS 4232 card are sent in 'strings', which are not zero-terminated, but terminated with either a checksum **<CHKSUM>** calculated over the entire message or by a carriage return **<CR>**. The brackets <> are not part of the syntax, but are used to identify a single byte.

<CR> has the ASCII value 10.

_ (underscore) is used in this paper to identify the space character. (ASCII value 32)

IMPORTANT: In order for the RS 4232 Card to relay status messages other than the start-up message it's necessary to transmit one of the question mark commands to the RS 4232 card. (e.g. "?M<CR>") Upon reception of one of these status request commands, the RS 4232 card acknowledges that an external peripheral is connected to the serial port and starts relaying all status messages on this port.

Data from the RS 4232 Card

Startup message from RS 4232

"!W_RS 4232_version_1.0_Copyright_DIS_(Danish_Interpretation_Systems)_1995<CR>"

This message is sent from the interface card, after Power Up. The version number and/or year will be altered in upgraded versions of the RS 4232 software.

Number of microphones connected

"!M<CU1:CHAIN1><CU1:CHAIN2><CU2:CHAIN1> ... <CU10:CHAIN2><CHKSUM>"

This message is sent as response to a request on the number of microphones connected in the system when the number of microphones in the system is changed, or a chain of microphones changes state (valid/invalid). The byte **<CU1:CHAIN1>** contains the number of microphones connected to CU number 1 Chain number 1 and so forth. Data is sent for each of the 10 CU's with each 2 Chains allowed in a single system. A single chain can contain from 0 to 50 microphones.

If a Chain is identified as invalid (due to a faulty microphone or a change in the number of microphones) the number 255 is sent. In case a chain is invalidated during operation, the remaining system will still work. When a chain is invalidated this message also implies that microphones in this chain are turned off from Speak or Request - hence no separate messages are sent.

Chairmen connected

"!C<CHAIRMAN1 CU><CHAIRMAN1 CHAIN><CHAIRMAN1 MIC>
....
<CHAIRMAN10 CU> <CHAIRMAN10 CHAIN><CHAIRMAN10 MIC><CHKSUM>"

<CHAIRMAN1 CU> holds the number of the CU (1-10) to which the first chairman microphone is connected. If this chairman microphone is not present in the system this byte takes on the value 0.

<CHAIRMAN1 CHAIN> holds the number of the Chain (1-2) to which the first chairman microphone is connected.

<CHAIRMAN1 MIC> holds the number of the Chairman microphone in the Chain (1-50).

Data is sent for the possible 10 Chairman microphones.

Maximum number of delegates speaking

"!K<MAXSPK><CHKSUM>"

This message contains the maximum number of delegate microphones allowed to be in Speak at any time. This system value ranges from 1 to 6.

Maximum number of delegates in request

"!Q<MAXREQmsb><MAXREQlsb><CHKSUM>"

This message contains the maximum number of delegate microphones that can be put in request at any time. **<MAXREQmsb>** contains the most significant byte, and **<MAXREQlsb>** contains the least significant byte. This system value ranges from 1 to 999.

System mode

"!E<MODE><CHKSUM>"

This message is sent when the mode of operation for the CDS 4000 system changes. Possible modes are:

'**A**': AUTOMATIC

'**F**': FIFO

'**M**': MANUAL

Volume Control

"!V<MIC VOLUME><INPUT VOLUME><CHKSUM>"

This message is sent, when one of the volume controls is adjusted. The possible range for each of the two volume controls is 0 to 64.

0: off

1: -42dB

2: -41dB

⋮

63: +20dB

Microphone is turned on

"!S<CU><CHAIN><MIC><CHKSUM>"

This message is sent, when a microphone is turned on.

<CU> is the number of the CU to which the microphone is connected (1-10).

<CHAIN> is the number of the Chain to which the microphone is connected (1-2).

<MIC> is the microphone number in the Chain (1-50).

If the microphone switched on, was in request, this message also implies that the request is deleted.

Microphone in Speak

"!s<CU><CHAIN><MIC><CHKSUM>"

This message is sent as response to a request for the system status. The message is sent for each microphone currently switched on.

Microphone is put in Request

"!R<CU><CHAIN><MIC><CHKSUM>"

This message is sent when a microphone is put in request.

Microphone in Request

"!r<CU><CHAIN><MIC><CHKSUM>"

This message is sent as response to a request for the system status. The message is sent for each microphone currently in request. The messages are ordered so that the microphone put in request first will be identified in the first message and so forth.

Microphone is turned off

"!O<CU><CHAIN><MIC><CHKSUM>"

This message is sent, when a microphone is turned off. This message is used regardless of whether the microphone was in Speak or Request before it was turned off.

Delegate Off activate ackn. message

"!D<CR>"

This message is sent from the interface card to acknowledge the reception of a Delegate Off activate message.

Delegate Off deactivate ackn. message

"!d<CR>"

This message is sent from the interface card to acknowledge the reception of a Delegate Off deactivate message.

Conversion Table download acknowledge message

"!P<POSmsb><POSlsb><CHKSUM>"

This message is sent from the interface card to acknowledge the reception of a Conversion Table download message. The bytes <POSmsb> and <POSlsb> identifies the position in the conversion table where the update was applied.

Test status message

"!T<T1><CHKSUM>"

This message is sent when the microphone system enters or leaves test mode, and as a response to the test status request message. If the byte <T1>=0 the system is not in test-mode. If <T1>=1 the system is running a test controlled by the master CU - other values of <T1> identifies which MC panel is currently running a system test. When the system is in Test mode it is not possible to control the microphones via the interface card.

RS 4232 card internal buffer overflow

"!X<CR>"

This message is sent when an internal buffer overflow occurs in the RS 4232 card. This may occur if the RS 4232 card receives messages from the master CU at a higher rate than it can relay the messages over the serial port - this may occur if the PC or other equipment connected to the RS 4232 card holds off transmission with the hardware handshake signal. Once transmission is re-established, the overflow message will be sent, and the external equipment has notified that one or more microphone Speak/Request/Off messages were lost. These are the only messages that can provoke an overflow, as all other messages are non-synchronic. When the external equipment has notified that some messages were lost, it is able to re-achieve correct microphone status by sending the microphone status request message to the RS 4232 card and collect the response from this request.

It is necessary to allow this overflow possibility to ensure that a faulty computer connected to the RS 4232 card does not bring down the entire microphone system.

Serial Receive overflow

"!F<CR>"

This message is sent from the interface card if an overflow occurs in the incoming data-stream from the external equipment. An overflow can only occur if the external equipment is not honouring the CTS/RTS hardware handshake signals. An overflow will result in the loss of one or more messages to the interface card, and these messages will have to be repeated.

Data to the RS 4232 Card

System status request messages

The external equipment can request the status of the various system variables. A message is automatically sent if an update of one of these variables occurs.

"?M<CR>": Number of microphones connected

"?C<CR>": Chairmen connected

"?K<CR>": Maximum number of delegates speaking

"?Q<CR>": Maximum number of delegates in request

"?E<CR>": System mode

"?V<CR>": Volume Control

"?T<CR>": Test status

Microphone status request

"?S<CR>"

This message requests the status of the microphones in the system and will be responded with a series of microphone in speak/microphone in request messages.

Commands to control the mic system

The commands to put a microphone in request/speak/off, adjust the volume control, set the maximum number of delegates speaking/in request, and change the system mode of operation are identical to the commands sent from the RS 4232, when any of these variables are changed from the CU.

Delegate Off activate message

"!D<CR>"

Sending this message to the interface card has the same effect as pressing a Delegate Off button on a chairman microphone. In Manual and Automatic mode all delegate microphones will be turned off - in Fifo mode the delegate microphones will be muted. While delegate off is activated it will not be possible for delegate microphones to switch on.

The interface card will respond to this message by returning a Delegate Off activate acknowledge message.

Delegate Off deactivate message

"!d<CR>"

This message deactivates the delegate off function of the interface card.

!! IT IS VERY IMPORTANT THAT THIS MESSAGE IS SENT FOLLOWING THE DELEGATE OFF ACTIVATE MESSAGE TO ALLOW DELEGAT MICROPHONES TO BE SWITCHED ON AGAIN.

The interface card will respond to this message by returning a Delegate Off deactivate acknowledge message.

Conversion Table Download message

"!P<POSmsb><POSlsb><LOG1msb><LOG1lsb> ... <LOG10msb><LOG10lsb><CHKSUM>"

This message is sent to the interface card to update the conversion tables of the MC 4000 panels in the microphone system. Please refer to the MC 4000 chapter for a description of the Conversion Table.

The bytes <POSmsb> and <POSlsb> are the most significant byte and least significant byte respectively of the physical number entry in the conversion table from which the following logical numbers will be inserted. The physical number POS will receive the logical number LOG1, the physical number POS+1 will receive the logical

number LOG2 and so forth. 10 consecutive physical numbers are always updated upon reception of a download message. Note observe the restriction 1<=POS<=990 – POS and the following 9 positions all have to be within the conversion table bounds. It is not possible to invalidate the conversion table by giving two physical numbers the same logical number - the MC 4000 software enforces the basic rule that all logical numbers in the conversion table have to be different. The interface card will respond to this message by returning a Conversion Table Download acknowledge message.